

DIETS ENRICHED IN ESSENTIAL AMINOACIDS AND PREVENTION OF AGING DISEASES

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Metabolic syndrome is a chronic disease epidemic in a large part of the industrialized countries; its presence increases with aging (Grundy, *Arterioscler Thromb Vasc Biol* 28: 629-36, 2008) and it's characterized by visceral obesity, insulin resistance, arterial hypertension and dyslipidemia. Clinical signals are similar to the aging pathologies, suggesting possible molecular processes in common; therefore, because of the complexity of these molecular origins, therapy is difficult to approach and based on the administration of multiple drugs, that arises the interaction and adverse affects risks. In our lab we demonstrated that the biogenesis and mitochondrial function is induced by the nitric oxide produced by the endothelial nitric oxide synthase (eNOS) (Nisoli et al., *Science* 299: 866-9, 2003; Nisoli et al., *Proc Natl Acad Sci USA* 101: 16507-12, 2004). In animal models of metabolic syndrome we observed a reduced mitochondriogenesis eNOS dependent and a deficit in ATP production in adipose and muscular tissues; also in patients we had evidence supporting this theory Nisoli et al., *Circ Res.* 100: 795-806, 2007). For this reason the aim of our studies is to identify molecules able to induce biogenesis of functional mitochondria, in an e-NOS dependent pathway, in the active metabolic tissues (skeletal muscle, adipose tissue) of animal models. For example, we tested the effect of a ramified chain enriched aminoacidic (BCAA) mix on the mitochondriogenesis processes in vitro, in different cell lines (adipose, skeletal and cardiac muscle cells) and in vivo, in a murine animal model, with interesting results, in particular as a stimulation for the biogenesis.